Dry Aggregate Size Distribution

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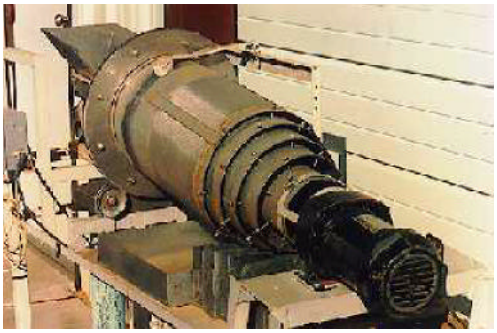
The dry aggregate size distribution (DASD) is an important soil property that we measure for loose, non-crusted soils. The DASD refers to the relative amount of surface soil aggregates, by size class, as measured by dry sieving procedures (Chepil, 1942). The effect of DASD on wind erosion was first described by Chepil (1951). Particles of mineral soils greater than 0.84 mm diameter are considered nonerodible by wind.

Research has shown that the distribution ofaggregates on the soil surface is generally log-normal and can be adequately described by the geometric mean diameter and the geometric standard deviation (Gardner, 1956). We measure DASD by dry sieving a 5 kg air-dried sample of surface soil in a rotary sieve (Fig 1., Chepil, 1942). We then regress the natural logarithm of sieve diameter on the normal probability of the fraction of soil passing that diameter (Fig 2). The normal probability is determined using the PROBIT function of SAS[1] software (SAS, 1990). The geometric mean diameter is the antilog of the sieve size at 50% passing. The geometric standard deviation is described by the equation (Allen, 1981):

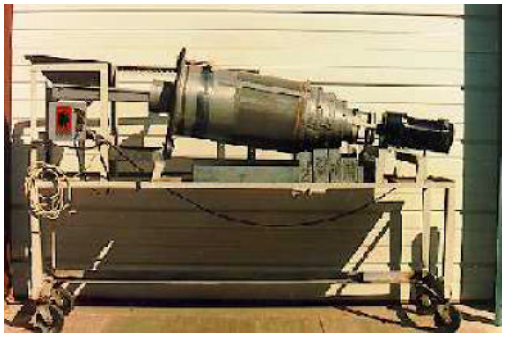
$$\text{GMD/Diameter at 84\% passing} \qquad [1]$$

Fig 1. Compact Rotary Sieve used to determine dry aggregate size distribution.

Front View



Side View



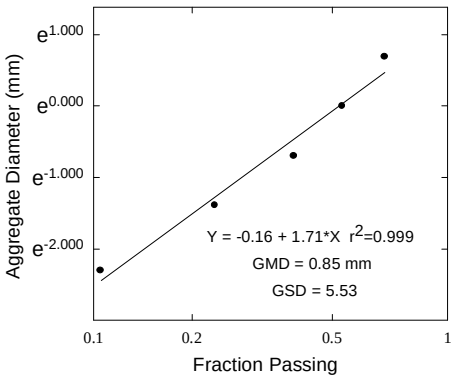


Fig 2. Logarithm of aggregate size versus fraction passing sieve of the specified diameter. Fraction passing axis has a probability scale.

References

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